Stock Price Reaction to Earnings Announcement: Case of an Emerging Market

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Abstract

Disclosure of financial statements by corporate firms is an important requirement of good corporate governance practice. This information is crucially important for rational decision making by investors who are willing to invest in stock of the firm based on fundamentals of the company. The speed with which this information is absorbed to stock prices is an important determinant of market efficiency. In a semi strong form efficient stock market the prices instantaneously and accurately adjust to new information. This paper conducts an event study analysis on an emerging market namely the Karachi Stock Exchange (KSE) by investigating the stock price reaction to public announcement of quarterly after tax profit by listed firms. By employing five year data on stock prices from January 2004 to August 2008 for 114 non financial firms it was found that information about earnings are quickly absorbed in prices before earning announcement is made so that there is no abnormal return post earnings announcement. Moreover the study provides evidence that there is a bigger element of surprise in bad news than in good news as the market reaction to bad news is stronger. A stronger reaction to bad news means that investor's interpretation of earnings news is homogenous.

Keywords: *Earnings announcement, emerging markets, event study*

1. Introduction

Timely announcement of earnings and other cash flows is an important dimension of efficient and transparent corporate practice. The magnitude and timing of announcement related to earnings provide useful information to investors regarding the financial strength of firms. A number of studies point towards information content of earnings disclosure. For instance, Ball and Brown (1968); Chari, Jagannathan, and Ofer (1988); Kross and Schroeder (1984); Easton and Zmijewski (1989); and Gennotte and Truemann (1996) find that stock prices respond positively to announcements of increase in earnings and negatively to announcements of decrease in earnings for the US firms. Khotari and Warner (2006), MacKinlay (1997), and Corrado (2011) provide review of many articles published on the subject.

In addition, in financial economics stock prices are assumed to be the discounted value of all future cash flows and incorporate all relevant information. Event studies on earnings announcement provide an important test of semi strong form efficiency of the stock market (Fama, 1991). Efficient Market hypothesis describes that in efficient market prices fully and instantaneously absorb all the new information.

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Figure1. Reaction of stock price to new information in efficient and inefficient markets

Overreaction

Price

150

140

100

Efficient market Reaction

Delayed Reaction

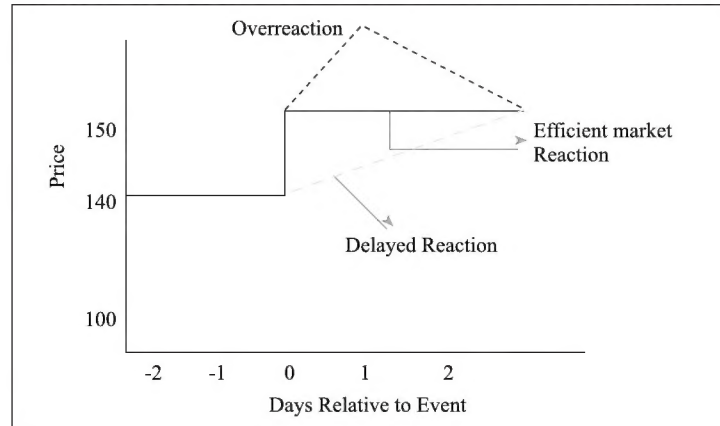-2   -1   0   1   2

Days Relative to Event

Figure 1 based on Ross et al. (2008), shows the difference between the efficient market and inefficient market. If the market is efficient it absorbs all information at the event time and new price level is instantaneously established but in inefficient market such information is not absorbed at the event day and it takes time to adjust to new equilibrium level.

There are only a few event studies on non-US markets particularly, in emerging markets. In a study on the Chinese stock market, Su (2003) investigated the stock price reactions to changes in earnings per share (EPS) in the Chinese domestic A-share and international B-share firms. The results indicate that A-shares fail to adjust new earnings information quickly, but international B-share investors can predict earnings changes better than A-share investors. As a result, abnormal returns can be obtained by trading on the earnings information, but for A-shares only. They attribute this finding to the type of ownership of the shares. The A-share holders are usually individual investors whereas the B-shares are mostly owned by large institutions that trade on more detailed and accurate financial information not immediately available to A-share holders.

The purpose of this research is to conduct an event study analysis of earnings announcement in the Karachi Stock Exchange which is Pakistan's biggest and the most active stock exchange (Iqbal, 2012). Most of the event studies are performed in the developed capital markets particularly, the US and the UK markets. Conducting event studies on emerging markets is quite challenging due to their excessive prices volatility which is a consequence of the relatively instable political and macroeconomic conditions. So, in emerging markets uncovering any systematic abnormal returns to a corporate action is not easy. Furthermore, in the developed markets the firms are closely followed by financial analysts who provide the forecast of the earnings for firms they follow. Thus a database of benchmark forecasts is easily available to assess whether the actual announcement is considerably above or below expected or have no information content. In developing countries, such database are difficult to obtain. The study relies on the information contained in the actual earnings figures to classify the type of announcement.

The event which this study considers is the quarterly after tax profit announcement by firms listed on the Karachi Stock Exchange. The data on earnings announcement is retrieved from the Karachi Stock Exchange website (KSE, 2008) over the period from January 2004 to August 2008. The price data for the matching firms are obtained from DataStream database.

2. Methodology

2.1 Measuring Abnormal Returns

The event under study is after tax quarterly profit announcement by listed companies. The date and amount of profit declared by companies are obtained from the website of the Karachi Stock Exchange. The study follows MacKinlay (1997) and thus includes event day plus 30 surrounding days i.e., a total of 61 days as event window. The event period is not included itself in estimation period to prevent the event from influencing the parameter estimates.

The next issue is the firms to include in the event study analysis. For this study, the sample of non financial firms which are listed on the Karachi Stock Exchange is employed. Initially, considered the quarterly announcement for all the listed firms was considered. However, for many firms sufficient number of announcements was not available. Therefore, the sample is restricted to firms that have at least ten quarterly announcements during the period. This is important since the benchmark quarterly announcement (median earring) has to be estimated from the data. Finally, filtering the data the sample arrived at 114 firms to be considered for the event study.

Using daily data on continuously compounded returns and returns on the KSE-100 index as the market index the parameters of the market model which forms the basis of measuring abnormal returns are estimated.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{1}$$

With $E(\varepsilon_{it}) = 0$ and $Var(\varepsilon_{it}) = \sigma_{\varepsilon i}^2$

Where R_{it} and R_{mt} are the period t return on firm t and the market portfolio respectively, and ε_{it} is the zero mean disturbance term; α_i , β_i and $\sigma_{\varepsilon i}^2$ are the parameter of market model. It is difficult to separate the movement of stock price resulting from the announcement of an event by the firm from the general market movement. The residuals of the market model reflect the price reaction due to the event under study. Thus market model provides a way of extracting signals from the noise. The residuals are estimated through market model. The average abnormal returns and cumulative abnormal returns are then computed.

Using 61 days as the event window the abnormal returns which are calibrated are as follows:

$$\hat{AR} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

The abnormal return is the residual of the market model calculated on an out of sample basis over the event window. The abnormal returns are then averaged across firms and announcement as follows.

$$\overline{AR_\tau} = \frac{1}{N} \sum_{i=1}^{N} \overline{AR_{i\tau}}$$

(3)

Next, the average abnormal returns can be aggregated over the event window to calculate the cumulative abnormal returns (CAR) for each firm i as:

$$\overline{CAR(T_1,T_2)} = \sum_{\tau=T_1}^{T_2} \overline{AR_\tau}$$

(4)

Figure 2. Time line for event study
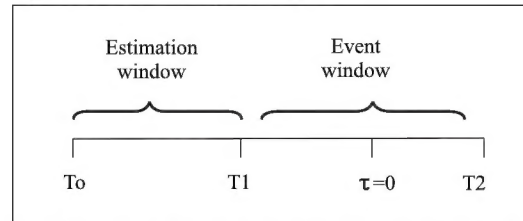
The figure shows the schematic view of event window and estimation window.

2.2 Classification of News

If earnings disclosures have information content, then 'higher than expected' earnings should be associated with increase in value of the equity and 'lower than expected' earnings with decline in equity value. These earnings announcements are classified in three categories i.e., good news, bad news and no news. This is due to the fact that the stock prices are expected to show upward movement only if they contain a positive surprise for investors. The US studies, such as MacKinlay (1997) employed financial analyst database to classify declared earnings announcement as good news, bad news or no news. If the actual earnings announcement at a particular date is higher than +5% of the forecast value then the news is declared as good news; otherwise the news is declared as no news and if the actual earnings announcement at a particular date is less than 5% of the analyst value then the news is declared as bad news.

In developing stock markets, such information about financial analyst forecast are not readily available so statistical criteria has been used to classify the type of earnings announcement. Specifically, median of announced quarterly earnings of a company is employed as a benchmark to classify the announcement. According to this statistical strategy if the actual earning declared by the company at a particular date is within 10% of the median earning, it is classified as no news. If the actual earning is less than 10% of the median earning, the news is classified as bad news. The announcement with earning greater than 10% of the median earning is classified as good news. This classification may also be described as follows:

Good news: Actual Earning > 10% of Median Earning

No news: Actual Earning within ± 10% of Median Earning

Bad news: Actual Earnings < 10% of Median Earning

Median instead of mean is used as benchmark because if the earnings have outliers mean is not a representative measure of typical earnings magnitude. Median is less affected by the extreme observation. The earnings distribution is generally positively skewed. Also, owing to highly volatile nature of returns in emerging markets, our classification of news cover a larger range compared to MacKinlay (1997).

The data consist of 701 quarterly announcements which comprise 43% good news, 42.5% bad news while the remaining 16.5% no news.

3. Results and Discussion

Table 1 (see appendix) presents the average abnormal returns (AR) and average cumulative abnormal returns (CAR) for all the firms at an aggregate level. Figure 3 presents the cumulative abnormal returns.

Figure 3 shows that the average CAR for good news starts moving upward prior to the event date. This is consistent with MacKinlay's argument that the market learns about the impact of forthcoming announcement. The average CAR of good news firms gradually drift up in initially. After the event date average CAR gradually stabilizes since after the announcement there is no more surprise for the investors. The average CAR of bad news generally declines initially but starting from the event date it shows slightly upward trend and eventually stabilize towards the end of event window. For no news announcement the average CAR have generally trend less pattern although during the event window the sample average CAR are negative for the no news category firms.

Figure 3. Average Cumulative Abnormal Returns for Earnings Announcement (all firms)
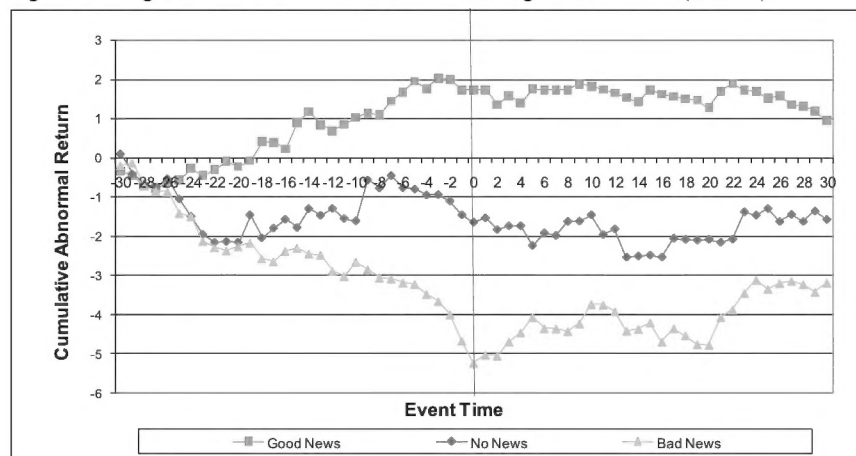
The graphs of CARs disaggregated into different sectors are presented in appendix. The graphs for the individual sectors (panel a, c, e) show a similar pattern. Since the number of announcements in individual sectors is small, the patterns which are observed for average CAR are not as discerning as for the aggregate of all firms. The CAR of individual sectors is subject to higher fluctuations due to small sample size.

By looking at the results of overall sectors (see figure 3) it can be observed that if an investor had invested in a company 30 days prior to the announcement of unexpected high earnings company then he would have realized approximately 2% returns on event day. This amount is compounded to 26.8% annually. It is interesting to observe that the estimate for event day average CAR is very close to the one obtained by MacKinlay (1997) for Dow Jones 30 firms. During this period the risk-free investment has rewarded much less. For example, average annual yield on 6 month Treasury Bill rate issued by State Bank of Pakistan was nearly 6.5% during the 5-year sample period (IMF). Thus good news firms reward nearly 20% annual risk premium. On event day, good news firms on average generate about 6% return differential compared to the bad news firm. This amounts to on average about 100% compounded annually.

Post-announcement, there are no significant excess cumulative abnormal returns. Thus if an investor had invested in good news firm on the event day then on average there are no cumulative abnormal returns one month later. This result points to the fact that information has been absorbed on or before the earnings announcement date. After the announcement, the average CAR are relatively stable. These results are consistent with semi strong form efficiency of the Karachi stock market.

The results also corroborate the findings of earlier studies which document asymmetry of stock price reaction of good and bad news. For example Fooladi and Roberts (1988) found a stronger reaction to announcements of dividend cuts than to those of dividend increase. Similarly, Conrad, Corner and Landsman (2002) find that stock prices respond more strongly to negative than positive earnings surprises. These studies provide evidence that there is a bigger element of surprise in bad news than in good news. This can also be related to the asymmetric GARCH literature where the volatility increases following a bad news are higher than those for bad news of same magnitude. Following the argument of Chang et al. (2013) it can be concluded that investors in the Pakistani stock market interpret earnings news homogenously.

4. Diagnostic Checks on Market Model Regression

A sequence of diagnostic and misspecification tests was conducted on the market model regression for the estimation window. Specifically, four types of diagnostic tests were used to assess the adequacy of the market model given by:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad where \quad i = 1...N$$

These tests include normality of market model residuals, serial correlation, heteroskedasticity and RESET test of as general specification error test. The JB normality test was conducted on the residuals of market model regression for each earnings announcement. The JB test is given by:

$$JB = \frac{N-k}{6}[S^2 + \frac{(K-3)^2}{4}] \sim \text{Chi Sq (2 df)}$$

Table 2 reports the average value of test statistic and average p-value for individual sectors and for all sectors. The column '% reject' indicates percentage of times when null hypothesis of normality is rejected. The average p-value for all sectors is 0.07 which indicates residual non-normality at 5% level of significance. However, due to small number of announcements for individual sectors the extent of non-normality is severe as indicated by lower average p-values.

The Bruche-Godfey (BG) test of serial correlation in residuals is next reported. As for the JB test average value of statistic and average p-values are reported. The test statistics for lag order p is based on the auxiliary regression of residuals

$$\varepsilon_{it} = X_t \gamma + \sum_{s=1}^{p} \alpha_s \varepsilon_{it-s} + v_{it}$$

where in our case X comprise an intercept and market return factors. The BG Lagrange Multiplier (LM) test is number of observations multiplied by r-square of the auxiliary regression. Under the null hypothesis of no serial correlation the LM test statistics is distributed as Chi Square with p degrees of freedom and p=6 are employed. The results aggregated across all sectors yield p-value of 0.28. The individual sectors also indicate similar results. However, for some individual announcements the null of serial correlating was rejected as reported by '% reject' column.

The Whites test of heteroskedsticty is based on an auxiliary regression of the market model residual given by

$$\varepsilon_{it}^2 = \gamma_0 + \gamma_1 R_{mt} + \gamma_2 R_{mt}^2 + v_{it}$$

The test statistic is number of observations multiplied by R-square of this regression. The test is asymptomatically distributed as a Chi Square with number of degrees of freedom equal number of variables in the auxiliary regression which is 2 in present case. The results in Table 2 indicate that the average p-values across all announcements is 0.48. The average p-values aggregated across individual sectors are also larger than the conventional level of significance.

RESET is a general test for the following types of specification errors, including omitted variables or incorrect functional form. The test statistics for Ramsey RESET test is log likelihood ratio for testing the hypothesis that the coefficients on the powers of fitted values are all zero or not. The results in Table 2 indicate that aggregated over individual sectors and across all sectors the p-values do not show signs of mis-specification

Except for the normality, in market model, there is little concern for serial correlation, heteroskedasticity and specification error. Overall, the market model regression to compute abnormal returns is well specified. In addition, the analysis is based primarily on economic significance, the non-normality of residuals is of no concern.

5. Conclusion

The study investigated the stock price reaction to earnings announcement by firms listed at the Karachi Stock Exchange. The data for quarterly earnings announcement was selected from Karachi Stock Exchange website and the matching firm's stock prices were obtained from the DataStream database. For each firm and for each announcement abnormal returns were computed by using market model regression. These abnormal returns and cumulative abnormal returns were then aggregated across firms for each of the date in event window.

It was found that on an average, during the 30-day period prior to earnings announcement the investor can gain 2% cumulative average returns on event day. This return is much higher than the risk-free rate during the period of study. Estimates establish that the firms with higher than expected earnings announcement can provide 20% annual risk premium. During the 30-day period prior to earnings announcement good news firms on average generate about 6% differential in abnormal returns compared to the bad news firm. This amounts to on average about 100% on annual basis.

Results indicate that information in earnings disclosure has been absorbed on or before the earnings announcement date. This implies that the Karachi stock market can be considered informational efficient since stock prices quickly absorb the new information. In the days after the announcement the average cumulative abnormal returns are relatively stable and consistent with the market efficiency. It is also observed that the stock prices react asymmetrically to the unexpectedly high or low earnings announcement. If the earnings announced is less than expected, then the price drop is much higher than the earnings increase announcement of the same magnitude. The results thus support the findings of earlier studies which document asymmetry of stock price reaction of good and bad news. The study provides evidence that there is a bigger element of surprise in bad news than in good news as the market reaction to bad news is stronger.

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Appendix

Table 1
Average AR and Average CAR over the event window for all firms

Event Days	Good News		No News		Bad News	
	AR	CAR	AR	CAR	AR	CAR
-30	-0.33	-0.33	0.11	0.11	-0.20	-0.20
-29	-0.12	-0.45	-0.51	-0.41	0.06	-0.14
-28	-0.27	-0.73	-0.26	-0.67	-0.57	-0.71
-27	-0.05	-0.77	-0.08	-0.74	-0.14	-0.85
-26	0.15	-0.62	0.22	-0.52	-0.02	-0.87
-25	0.06	-0.56	-0.52	-1.05	-0.55	-1.42
-24	0.29	-0.27	-0.44	-1.49	-0.09	-1.50
-23	-0.18	-0.44	-0.46	-1.95	-0.63	-2.13
-22	0.16	-0.29	-0.21	-2.15	-0.15	-2.29
-21	0.21	-0.08	0.02	-2.13	-0.08	-2.37
-20	-0.14	-0.22	-0.02	-2.15	0.11	-2.26
-19	0.16	-0.06	0.70	-1.45	0.08	-2.18
-18	0.49	0.42	-0.59	-2.04	-0.40	-2.57
-17	-0.03	0.40	0.25	-1.79	-0.07	-2.64
-16	-0.17	0.23	0.22	-1.56	0.26	-2.38
-15	0.68	0.90	-0.21	-1.77	0.08	-2.30
-14	0.28	1.19	0.48	-1.29	-0.15	-2.45
-13	-0.34	0.84	-0.17	-1.46	-0.03	-2.48
-12	-0.15	0.70	0.18	-1.29	-0.41	-2.89
-11	0.16	0.85	-0.26	-1.54	-0.14	-3.02
-10	0.18	1.03	-0.06	-1.60	0.37	-2.66
-9	0.11	1.14	1.05	-0.56	-0.19	-2.85
-8	-0.04	1.10	-0.21	-0.76	-0.21	-3.06
-7	0.35	1.45	0.32	-0.44	-0.02	-3.08
-6	0.23	1.68	-0.31	-0.76	-0.10	-3.18
-5	0.27	1.95	-0.03	-0.79	-0.04	-3.22
-4	-0.19	1.76	-0.15	-0.94	-0.26	-3.48
-3	0.27	2.04	0.01	-0.93	-0.18	-3.66
-2	-0.03	2.00	-0.17	-1.10	-0.33	-3.99
-1	-0.27	1.73	-0.35	-1.45	-0.67	-4.67
0	-0.01	1.73	-0.19	-1.63	-0.56	-5.23
1	0.00	1.73	0.11	-1.53	0.20	-5.03
2	-0.37	1.36	-0.30	-1.83	-0.02	-5.05
3	0.23	1.59	0.10	-1.73	0.36	-4.69
4	-0.19	1.40	0.00	-1.73	0.23	-4.45
5	0.36	1.75	-0.50	-2.23	0.38	-4.07
6	-0.02	1.73	0.32	-1.91	-0.28	-4.35
7	0.00	1.73	-0.06	-1.98	0.00	-4.35
8	0.01	1.74	0.36	-1.62	-0.07	-4.42
9	0.15	1.89	0.01	-1.61	0.19	-4.23
10	-0.06	1.83	0.16	-1.45	0.49	-3.73
11	-0.08	1.75	-0.50	-1.95	-0.02	-3.75
12	-0.09	1.66	0.14	-1.81	-0.16	-3.92
13	-0.12	1.54	-0.72	-2.53	-0.50	-4.41
14	-0.11	1.43	0.03	-2.50	0.05	-4.37
15	0.30	1.73	0.02	-2.48	0.16	-4.20
16	-0.10	1.63	-0.05	-2.53	-0.49	-4.69
17	-0.06	1.57	0.48	-2.05	0.34	-4.35
18	-0.06	1.51	-0.03	-2.08	-0.18	-4.53
19	-0.03	1.48	-0.02	-2.09	-0.22	-4.76
20	-0.20	1.28	0.02	-2.08	-0.02	-4.78

21	0.42	1.70	-0.08	-2.15	0.71	-4.07
22	0.20	1.90	0.08	-2.07	0.20	-3.87
23	-0.18	1.72	0.70	-1.37	0.42	-3.45
24	-0.02	1.70	-0.08	-1.46	0.34	-3.12
25	-0.19	1.52	0.17	-1.29	-0.23	-3.34
26	0.07	1.59	-0.33	-1.62	0.14	-3.20
27	-0.23	1.36	0.18	-1.44	0.06	-3.15
28	-0.05	1.32	-0.18	-1.62	-0.09	-3.23
29	-0.12	1.20	0.26	-1.35	-0.20	-3.43
30	-0.24	0.96	-0.21	-1.57	0.23	-3.19

Table 2
Summary of Diagnostic Tests

	JB Normality			**BG LM Serial Correlation**			**White Heteroskedasticity**			**RESET**		
Sector Name	Statistic	P-value	% reject	Statistic	P-value	% reject	Statistic	P-value	% reject	Statistic	P-value	% reject
					6 lags		all cross product terms			2 terms sq and cubic		
Textile	12799.69	0.05	87.50	12.78	0.25	45.00	2.59	0.47	10.00	3.00	0.42	11.25
Sugar	2603.19	0.06	86.96	11.98	0.24	32.61	3.67	0.43	14.13	2.70	0.43	9.78
Chemical	361319.10	0.04	87.06	10.07	0.32	24.71	4.03	0.44	27.06	3.60	0.36	17.65
Cement	1495.84	0.09	71.83	9.55	0.31	23.94	5.31	0.33	26.76	4.25	0.36	19.72
Engineering	23305.61	0.07	80.34	9.59	0.38	22.22	2.52	0.50	7.69	3.20	0.38	14.53
Fuel and Energy	2830.94	0.01	94.59	11.77	0.30	36.49	4.58	0.40	22.97	4.17	0.37	22.97
Other Textile	150.77	0.03	91.43	15.93	0.16	48.57	4.09	0.45	20.00	4.20	0.45	17.14
Paper and Board	70.66	0.00	100	14.39	0.17	42.86	3.91	0.43	28.57	5.39	0.23	28.57
Tobacco	1529.74	0.00	100	12.23	0.14	12.50	3.93	0.33	12.50	4.73	0.38	12.50
Transport and Communication	889.45	0.08	80.00	8.98	0.30	13.33	2.31	0.55	75.47	4.15	0.40	20.00
Vanaspati and Allied	5.13	0.22	40.00	10.70	0.28	40.00	4.18	0.27	20.00	3.65	0.43	40.00
Miscellaneous	2830.94	0.01	94.59	11.77	0.30	36.49	4.58	0.40	22.97	4.17	0.37	22.97
All Sectors	50477.52	0.07	82.88	11.72	0.28	33.52	3.50	0.44	16.69	3.52	0.38	16.12

Table A1
List of Companies included in the event study

| S.No.	Company	Sector
1	Artistic Denim Mills Ltd.	Textile
2	Crescent Spinning Mills Ltd.	Textile
3	Gadoon Textile Mills Ltd.	Textile
4	Ideal Spinning Mills Ltd.	Textile
5	Kohinoor Textile Mills Ltd.	Textile
6	Mohammad Farooq Textile Mills Ltd.	Textile
7	Nishat Mills Ltd.	Textile
8	Nishat (Chunian) Ltd.	Textile
9	Reliance Weaving Mills Ltd.	Textile
10	Saif Textile Mills Ltd.	Textile
11	Sargodha Spinning Mills Ltd.	Textile
12	Suraj Cotton Mills Ltd.	Textile
13	Taj Textile Mills Ltd.	Textile
14	Usman Textile Mills Ltd.	Textile
15	Yousaf Weaving Mills Ltd.	Textile
16	Dewan Salman Fibre Ltd.	Fibre/Synthetic Textile
17	Gatron (Industries) Ltd.	Fibre/Synthetic Textile
18	Ibrahim Fibres Ltd.	Fibre/Synthetic Textile
19	Indus Polyester Company Ltd.	Fibre/Synthetic Textile
20	Pakistan Synthetics Ltd.	Fibre/Synthetic Textile
21	Abbott Laboratories (Pakistan) Ltd.	Chemical
22	Berger Paints Pakistan Ltd.	Chemical
23	Clariant Pakistan Ltd.	Chemical
24	Dawood Hercules Chemicals Ltd.	Chemical
25	Dynea Pakistan Ltd.	Chemical
26	Engro Chemical Pakistan Ltd.	Chemical
27	Fauji Fertilizer Company Ltd.	Chemical
28	Fauji Fertilizer Bin Qasim Ltd.	Chemical
29	Ferozsons Laboratories Ltd.	Chemical
30	Glaxo Smithkline (Pakistan) Ltd.	Chemical
31	ICI Pakistan Ltd.	Chemical
32	Nimir Resins Ltd.	Chemical
33	Pakistan Pta Ltd.	Chemical
34	Searle Pakistan Ltd.	Chemical
35	Wah Nobel Chemicals Ltd. (Pub.)	Chemical
36	Nimir Industrial Chemicals Ltd.	Chemical
37	Ados Pakistan Ltd.	Engineering/Transport
38	Agriauto Industries Ltd.	Engineering/Transport
39	Al-Ghazi Tractors Ltd.	Engineering/Transport
40	Atlas Battery Ltd.	Engineering/Transport
41	Atlas Honda Ltd.	Engineering/Transport
42	Azgard Nine Ltd.	Engineering/Transport
43	Crescent Steel And Allied Products Ltd	Engineering/Transport
44	Dewan Farooque Motors Ltd.	Engineering/Transport
45	General Tyre & Rubber Co. Ltd.	Engineering/Transport
46	Ghandhara Nissan Ltd.	Engineering/Transport
47	Ghani Automobiles Ltd.	Engineering/Transport
48	Hinopak Motors Ltd.	Engineering/Transport
49	Honda Atlas Cars (Pakistan) Ltd.	Engineering/Transport
50	Huffaz Seamless Pipe Industries Ltd.	Engineering/Transport
51	Johnson & Philips (Pakistan) Ltd.	Engineering/Transport
52	Metropolitan Steel Corporation Ltd.	Engineering/Transport
53	Millat Tractors Ltd.	Engineering/Transport
54	Pak Elektron Ltd.	Engineering/Transport
55	Pak Suzuki Motor Company Ltd.	Engineering/Transport

| 56	Pakistan Cables Ltd.	Engineering/Transport
57	International Industries Ltd.	Engineering/Transport
58	Ghandhara Industries Ltd.	Engineering/Transport
59	Ados Pakistan Ltd.	Engineering/Transport
60	Al-Noor Sugar Mills Ltd.	Sugar
61	Ansari Sugar Mills Ltd	Sugar
62	Chashma Sugar Mills Ltd	Sugar
63	Dewan Sugar Mills Ltd	Sugar
64	Habib ADM Ltd	Sugar
65	Habib Sugar Mills Ltd.	Sugar
66	Haseeb Waqas Sugar Mills Ltd	Sugar
67	JDW Sugar Mills Ltd.	Sugar
68	Kohinoor Sugar Mills Ltd	Sugar
69	Mirza Suggar Mills Ltd	Sugar
70	Noon Sugar Mills Ltd.	Sugar
71	Pangrio Sugar Mills Ltd.	Sugar
72	Sakrand Sugar Mills Ltd.	Sugar
73	Shahmurad Sugar Mills Ltd	Sugar
74	Al- Abbas Cement Ltd.	Cement
75	Attock Cement Pakistan Ltd.	Cement
76	Cherat Cement Company Ltd.	Cement
77	Dadabhoy Cement Industries Ltd.	Cement
78	Dandot Cement Company Ltd.	Cement
79	Dewan Cement. Ltd. (Pakland Cem. Ltd.)	Cement
80	Fauji Cement Company Ltd.	Cement
81	Fecto Cement Ltd.	Cement
82	Gharibwal Cement Ltd.	Cement
83	Kohat Cement Ltd.	Cement
84	Lucky Cement Ltd.	Cement
85	Maple Leaf Cement Factory Ltd	Cement
86	Pioneer Cement Ltd.	Cement
87	Attock Refinery Ltd.	Fuel and Energy
88	Hub power (don't know)	Fuel and Energy
89	Japan Power Generation Ltd.	Fuel and Energy
90	Kar. Elec. Pow. Sup. Crp. Ltd. (KESC)	Fuel and Energy
91	Kohinoor Energy Ltd.	Fuel and Energy
92	Kohinoor Power Company Ltd.	Fuel and Energy
93	Mari Gas Company Ltd.	Fuel and Energy
94	National Refinery Ltd. (Pub.)	Fuel and Energy
95	Pakistan State Oil Company Ltd. (Pub.)	Fuel and Energy
96	Pakistan Refinery Ltd.	Fuel and Energy
97	S. G. Power Ltd.	Fuel and Energy
98	Shell Pakistan Ltd.	Fuel and Energy
99	Southern Electric Power Co. Ltd.	Fuel and Energy
100	Baluchistan Glass Ltd.	Miscellaneous
101	Eco. Pak. Ltd. (Plastobag Ltd.)	Miscellaneous
102	Emco Industries Ltd	Miscellaneous
103	Frontier Ceramics Ltd.	Miscellaneous
104	Ghani Glass Ltd.	Miscellaneous
105	Gillette Pakistan Ltd.	Miscellaneous
106	Leather Up Ltd.	Miscellaneous
107	Murree Brewery Company Ltd.	Miscellaneous
108	Quice Food Industries Ltd.	Miscellaneous
109	S. S. Oil Mills Ltd.	Miscellaneous
110	Packages Ltd.	Miscellaneous
111	Lakson Tobacco Company Ltd.	Miscellaneous
112	Pakistan Tobacco Company Ltd.	Miscellaneous
113	Pak. Tele. Co. Ltd. (PTCL) (Pub.)	Miscellaneous
114	Pak Datacom Ltd.	Miscellaneous

Figure A2. Sector-wise Plot of CAR
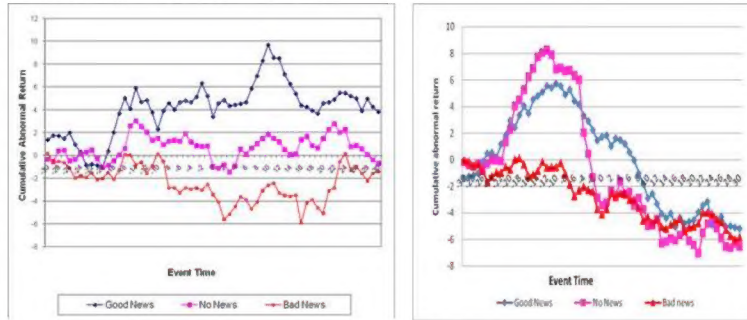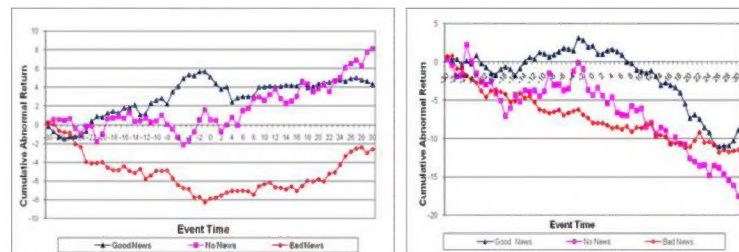

a: Textile

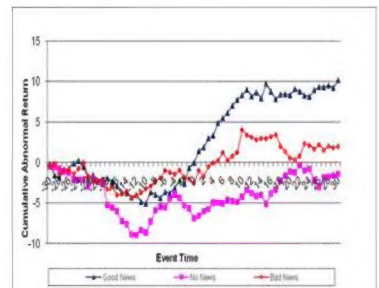b:Cement
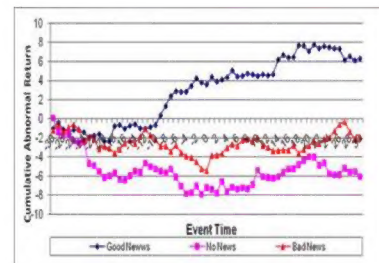
c. Chemical
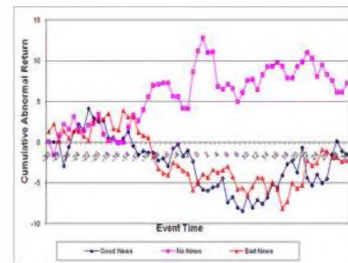
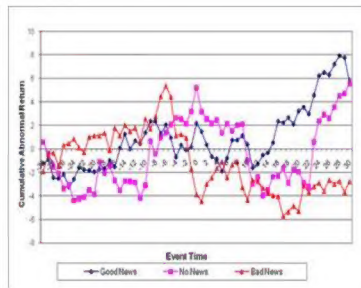d. Fibre/Synthetic

Figure A3. Sector-wise Graphs of CAR

e: Engineering

f: Sugar

g: Fuel and Energy

h: Miscellaneous